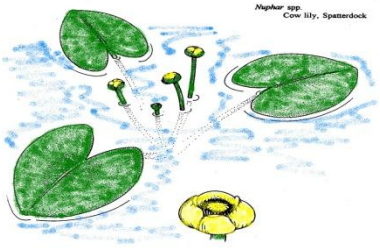
How To Use thePark for Self Guided Programs

There are three primary areas of the park that can be of interest to students. For those looking at small ecosystems the ponds provide opportunity to look at a somewhat closed ecosystem. The River Trail provides access to the Anacostia River and the boardwalk takes students into the fresh water marsh for access.

Pond Ecology

Ponds: The ponds are all human-made by building dirt dykes in an existing wetland. They are connected to each other and the surrounding wetland by pipes that run under the dykes and road. You may see these pipes draining or filling the ponds.

The ponds are habitat for fish, birds, turtles, northern water snakes, frogs, shell fish, snails and some mammals such as muskrat and beaver. The water provides a place to hide so be sure rock throwing is discouraged. Because the water is muddy from wind and animal activity, one may not see animals hiding in the mud at the bottom of the ponds and they can be injured by rocks hitting them. The ponds are also habitat for plants such as the native nuphar, cattail (corn dog on a stick), and an assortment of rushes and sedges. There is a field guide under the plant section

the 

http://www.nps.gov/keaq/naturescience/upload/all.pdf of web page if you want to concentrate on plants in their habitat.

Activities:

1: Have students try and figure out the 4 zones (water, mud, banks, and air space) of the pond where pond life exists. This is not easy. The water is a given. Determine what animals would spend their entire lives in water. Not many do.

Look for plants growing up out of the water. Where are their roots? This leads to another zone, the bottom mud surface where not only plants root, but amphibians and reptiles bury themselves to hibernate, and many mollusks lay just below the surface filtering water above them as dead plant and animal matter falls through the water.

At the edge of the ponds on a warm day you may find turtles basking. This brings us to another zone that holds the water is place, the edge of the pond. Amphibians and reptiles both may be in the water at any given time, then sun themselves close enough to the water to drop to safety, but on the pond edge.

Note any birds or insects you may see. They may hunt in the ponds but do they stay in the water or fly above it? If their food is in the water, but they fly, are they using another zone of the ponds? This is the fourth zone, the air space above the ponds.

An additional activity is to have students bring pencils and strips of paper in brown, dark blue, green, and light blue divided among your students to draw on the strips what they saw in each of these zones. Brown for mud at the bottom, dark blue for the water, green for the edge, and light blue for the air zone.

2: Having identified 4 zones look to birds and other animals to see how their legs and other body parts allow them to best utilize the zones. Do the birds in the area all have long legs and bills? Do some of the birds eat the insects that live in the pond area or are they all fish or algae eaters? How can you tell one from the other? What behaviors or bill shapes or flight speed would indicate what a bird's diet consists of?

If you are lucky, you will see the long legged birds moving slowly as they eye the water. Insect eaters are smaller, faster. Geese and mallard ducks graze on grass and algae and eat head down.

If you look through binoculars you will see claws on the turtles. This helps them cling to slippery mud slopes and trees where they sun.

Dragon flies first, do not have stingers and will not hurt you. They have hairy legs and are primarily interested in breeding and laying eggs and eating mosquitoes. Note a difference between the males who will sit on a stick or plant near the ponds, and the females who dip their tails in the water laying eggs. The females have to be careful not become dinner for fish and frogs. The eggs the female lays will mostly be eaten by fish and other animals before they hatch. Fortunately, some will hatch and the wingless nymphs will spend up to two years in the mud at the bottom of the pond and surface eating

insects that might eat us later. Then, they will climb out of the water to metamorphose into winged adults.

Listen for frogs in early spring and summer. The frogs in our area do not, no matter how many TV programs say otherwise, go "ribbit." Some make a soft snoring noise, others a clucking noise, others a peep, others sound like a rubber band being plunked or a cello played badly. How many do you see on the surface? Most frogs will just stick their noses above water to avoid the attention of the birds, snakes, and other animals that eat frogs. Have students try and figure out which of the small things in the water are tadpoles, (algae eaters) and which are gambusia fish (predators). Hint: The predators have to move quickly. Algae eaters graze slowly. Tadpoles have a round body with a tail, fish are streamlined.

3: If you have thermometers at your disposal, measure the difference in several locations between the air temperature and the water temperature. Are they consistently different? How might water help the Earth maintain a balanced temperature? If you come once in spring and once in fall this can be a significant difference.

4 Wrap up energy cycle:

Students should know the ponds get their initial energy from the sun. See if they can figure out from observation where it goes next. Looking at the edge of ponds and into the ponds students may find algae, a green plant covering the bottom of the ponds. Remember the algae eating tadpoles? What might geese and ducks be eating in the ponds when they are not eating grass on the banks? Algae?

What eats the tadpoles? What are the long legged birds eating?

The sun goes from algae and other plant in the water or near it to turtles, muskrat, and tadpoles and some plant eating fish, and then meat eating fish, birds, frogs, insects, and the long legged birds are the top predator one might see in the daytime.

Water Testing

If you have water testing equipment there are several places to use it to check water quality in the marsh. There is the beginning of the River Trail and, about a 5 minute walk down the trail a path leads on the right to the Anacostia River. At the beginning of the boardwalk students can go down a hill to a tidal gut or lower a bucket on a rope if tide is in from the boardwalk into the water at high tide.

Go to http://www.saltwatertides.com/dynamic.dir/potomacsites.html and click on Benning Road Bridge and the date you want to check for tidal information.

Impact of Tides on Wetland Habitat Types:

If you plan your trip for high or low tide students can make general observations of the impact of tides on wetland habitats in the park. They may be able to discern differences between built and natural

wetlands as well in terms of diversity of species suitable for attracting a variety of birds and other wetland wildlife.

Go to http://www.saltwatertides.com/dynamic.dir/potomacsites.html and click on Benning Road Bridge and the date you want to check for tidal information.

Both on the River Trail, around the ponds, and on the Boardwalk students can see differences in types of wetland and quality of wetlands. There are herbaceous marshes where the tide is deeper up to 3 feet on average, and transition zones where woody plants begin to grow, then swamps where the tide may be only a few inches deep and trees may not thrive, but they can live in the less saturated soil.

In the early 1990s the park built marsh land, visible at the beginning of the river trail and end of the boardwalk. These were engineered to clean the water flowing from the park into the Anacostia River. Along the left side of the ponds as looking from the visitor center is a fifty food deep remnant of the original swamp/marsh of Washington, DC that extends across the end of the ponds.

Comparing the number of species of these two areas is instructive in how nature favors diversity of plants for survival of an ecosystem and how people tend to simplify things. Scientists are looking at these remnant fresh water wetlands where they find them as they have the kinds of plants that will tolerate floods and drought, conditions expected in future years of climate change.

In early fall, a trip out the boardwalk can take the observant student past several wetland communities including wild rice, cutgrass, and cattail. The boardwalk, while improving visitor access to the marsh, also created a path of invasive plants such as mile-a-minute weed and purple loosestrife into the area. If your students are looking for service learning, pulling mile-a-minute and trash removal here are appropriate but notify the park in advance to ensure safety and that it is a good time to remove invasive plants. Pulling plants at the wrong time of year can actually spread invasive plants rather than remove them. A ranger can explain this to your class in an email or short talk if you would be interested.

There is more information on wetlands in the Distant Education area of the teacher pages.

A Chesapeake Bay Experience

Talking points as you travel around the ponds beginning clockwise past the visitor center to the boardwalk and back to the ponds

At beginning of swamp noted on map above: On the left is an acre and a half of the original wetland of Washington, DC. Once the whole of the Chesapeake Bay had such swampy places where the tide reached on most days, but were dry enough for trees to grow. This area is one of the most important features of this park, a time capsule of pre-Columbian Washington.

At the turn off for the boardwalk Facing the boardwalk: The mostly cattail marsh here in this corner is the result of human activity. At one time it was a continuation of the original marsh, but in the 1950s a horticulturalist filled in part of the original marsh to build ponds and planted phragmites, a non native to this area, invasive plant here on the right. In the early part of this century a group came and cut down the phragmites a couple of times and each time our resource managers came and sprayed the new growth to kill it. Once it was dead, native plants for the most part filled in behind.

This is typical of fresh water wetlands where water gets a foot deep at high tide.

At the first tidal gut (place where boardwalk crosses water): Water draining from upland areas eventually reach the tidal zone. In this spot, Nash Branch which begins outside DC in Maryland reaches the tidal Anacostia at this spot. This is characteristic of the entire Chesapeake Bay from the finger lakes of New York State to the mouth of the Chesapeake Bay. The land area draining into the Chesapeake Bay Watershed is much, much bigger than the water in the Bay, but eventually, all the little streams, do what Nash Branch does here. They reach a point where they meet a tidal influence river like the Anacostia, and begin the last of their journey to the Chesapeake Bay.

At the first boardwalk platform on left: at the very end on the right: Here the water is deeper at high tide, and while this is still a fresh water marsh, it is more typical of what you would see nearer the mouth of the Chesapeake Bay where tides are deep. The area between the boardwalk and tree line is the area to focus on. While this was engineered, it was done so to match natural wetland functions in other places of the Chesapeake Bay. These grassy spots are very good at filtering the water, which was the intent of replacing wetlands in the 1990s.

Back at the beginning of the boardwalk at the cattail marsh. The cattail is not a wetland plant in favor today, but as climate change continues cattails may be a preferred plant for farmers. The cattail has in the past been one of the most useful plants in North America. The shoots, now coming up from the mud can be cut and eaten like a vegetable. The pollen which will soon form above the female part of the cattail flower is high in fat and protein, the seeds are edible, the brown fuzzy part is antibacterial, the roots can be dug with great difficulty and turned into a type of flower. The leaves were woven and bundled for a variety of uses. The green flowers were boiled and eaten. All that was in the past, but today scientists are looking at the cattail again for its ability to produce food in spite of drought and flooding on a daily basis. This may be an important source of nutrition in the face of climate change.

Head toward the far end of the ponds: At the Victoria Ponds, noted on the map: The area here on the left is the end of the original wetland we talked about at the beginning. Note the non woody plant growth turning to woody near the board walk. This is a transition base entirely on tide depth. The deeper the tide, the less woody growth is seen. Over time, dead leaves and material trapped by the plants settle and build soil so land is constantly changing. As one area builds up another floods creating a wetland.

Half way up the ponds on way to visitor center: The area on the left is now a swampy area partly because of people and partly because the beaver keeps damming the creek that flows here. Look into the woods at low tide and you can see a concrete culvert or what's left of it. To show how what we know has changed this was a sewer that ran from Maryland to what was supposed to be giant basin to be built in the 1930s. In addition to flushing the river, the city thought this basin would be a nice place to swim in summer, with a sewer flowing into it. The sewer is gone, but sewage remains a major problem in the Chesapeake Bay watershed.